4. A force of 2.1 N is exerted on a 7.0 g rifle bullet. What is the bullet's acceleration?

$$F = ma$$

$$a = \frac{F}{m}$$

$$a = \frac{2.1\ N}{7.0\ g}$$

$$a = \frac{2.1\ \frac{kg * m}{s^2}}{7.0\ g}$$

$$a = \frac{2.1\ \frac{kg * m}{s^2}}{7.0\ g}\ x\ \frac{1{,}000\ g}{kg}$$

$$a = \frac{2.1\ \frac{m}{s^2}}{7.0}\ x\ 1{,}000$$

$$a = 3\bar{0}0\ \frac{m}{s^2}$$

9. What is the weight in newtons of a $12\bar{0}$ lbs person?

$$W = mg$$

$$W = m\ x\ 9.80\ \frac{m}{s^2}$$

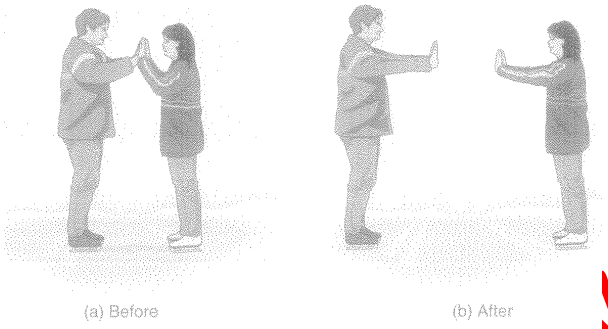
$$W = 12\bar{0}\,lbs \times \frac{1kg}{2.20\,lbs} \times 9.80\frac{m}{s^2}$$

$$W = 535\frac{kg * m}{s^2}$$

$$W = 535\,Newtons$$

$$W = 535\,N$$

21. Two ice skaters stand together as illustrated below. They "push off" and travel directly away from each other, the boy with a velocity of 0.50 m/s. If the boy weights 735 N and the girl 490 N, what is the girl's velocity after pushing off? (Consider the ice to be frictionless.)



$$p_{initial} = p_{final}$$

$$p_{initial} = m_{boy}v_{boy} + m_{girl}v_{girl}$$

(Initially, both their velocities are zero)

$$p_{initial} = 0$$

$$p_{initial} = 0$$

$$p_{final} = m_{boy}v_{boy} + m_{girl}v_{girl}$$

$$0 = m_{boy}v_{boy} + m_{girl}v_{girl}$$

$$\boldsymbol{m_{boy}v_{boy} = -m_{girl}v_{girl}}$$

$$W_{boy} = m_{boy}g$$

(Find the mass of the boy)

$$W_{boy} = m_{boy}\ x\ 9.80\ \frac{m}{s^2}$$

$$735\ N\ = m_{boy}\ x\ 9.80\ \frac{m}{s^2}$$

$$\boldsymbol{m_{boy} = 75.0\ kg}$$

$$W_{girl} = m_{girl} g$$

(Find the mass of the girl)

$$W_{girl} = m_{girl}\ x\ 9.80\ \frac{m}{s^2}$$

$$49\bar{0}\ N\ = m_{girl}\ x\ 9.80\ \frac{m}{s^2}$$

$$\boldsymbol{m_{girl} = 75.0\ kg}$$

$$m_{boy} v_{boy} = -m_{girl} v_{girl}$$

(Use the formula)

$$75.0\ kg\ x\ 0.50\ \frac{m}{s} = -50.0\ kg\ x\ v_{girl}$$

$$\boldsymbol{v_{girl} = -0.75\ \frac{m}{s}}$$